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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,648	04/18/2007	Chu Yong Cheng	03164.0204USWO	9712
23552	7590	12/29/2009	EXAMINER	
MERCHANT & GOULD PC			STALDER, MELISSA A	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/587,648	<b>Applicant(s)</b> CHENG ET AL.	
	<b>Examiner</b> MELISSA STALDER	<b>Art Unit</b> 1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 and 20-34 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 20-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>09-08-09</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15, 17, 22-26, and 28-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Preston (GB 2,109,357) in view of Davis (US 4,104,359) in view of Cheng (WO 02/22896).

Preston teaches a process for the extraction of nickel or cobalt from an aqueous solution. These metals are selectively removed from impurities such as magnesium (the metals can be separated from each other – pg. 1, lines 8-12). The process in Preston uses carboxylic acid extractants with oximes, preferably of aldehydes wherein the alpha-carbon atom is primary or secondary (abstract), such as 2-ethylhexanal oxime. Preston also teaches the presence of additives which greatly enhance the utility of extractants (kinetic accelerator) (pg. 1, lines 5-8). Preston teaches that it is known in the art to use tri-n-butyl phosphate (TBP) as a kinetic accelerator (pg. 2, table). Preston demonstrates the use of D2EHPA as a chelating agent with the oxime. Preston teaches that it is known in the prior art to use LIX63 which is a known chelating hydroxyoxime. Davis teaches the separation and nickel and cobalt in an acid leach where hydroxylamine sulfate (anti-oxidant) is added to the organic solution of an oxime, sulfonic acid and kerosene (Example). Cheng teaches a process for separating nickel

Art Unit: 1793

and cobalt from other elements contained in an aqueous leach solution such as calcium, magnesium, and manganese which remain in the leach solution. Cheng teaches the use of a carboxylic acid and an oxime. Further Cheng teaches the use of carboxylic acid in the extraction process where the carboxylic acid which contains any optionally substituted aliphatic or aromatic group, or combinations of these groups (pg. 5, lines 1-5). Therefore, it would have been obvious for one of ordinary skill in the art at the time of the invention to use a 2-methyl, 2 ethyl heptanoic acid because Cheng teaches the application of a broad number of carboxylic acids to be used in a similar extraction process. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the process of Preston with the hydroxylamine of Davis because Davis teaches that the acidic components in the mixture can degrade the  $\alpha$ -hydroxyoximes but the hydroxylamine sulfate minimized the effects of degradation (Example 1; col. 1, lines 13-23; col. 2, lines 21-32). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Cheng with Preston and Davis because Cheng also teaches a process for separating cobalt and nickel from impurities so that the metals are concentrated and can be recovered in a subsequent process. Preston teaches only that LIX63 has a slow reaction rate when extracting nickel. LIX63 is a well-known cobalt extractant.

Regarding claim 2, Preston teaches the avoidance of the formation of cobalt (III) which is not amenable to conventional stripping techniques (pg. 1, lines 62-64). Cobalt (III) is formed from cobalt (II).

Art Unit: 1793

Regarding claim 3, Preston teaches a stripping step using a mineral acid solution (pg. 1, lines 64-65). Preston teaches stripping the cobalt before cobalt (III) is formed.

Regarding claims 4 and 5, Cheng teaches a scrubbing step and a selective stripping step (pg. 9) where the stripping step is done after the scrubbing step. Additionally, Preston teaches steps for selective stripping of nickel or cobalt and nickel together (pg. 2, lines 1-4).

Regarding claim 6, Cheng teaches the use of a synergist in the extraction process (pg. 4).

Regarding claims 6-9, Preston teaches that the extraction takes place extremely quickly - "of the order of a few minutes" (pg. 1, lines 58-62).

Regarding claim 13, it would have been obvious to one of ordinary skill in the art at the time of the invention to use an alkylphenol, a well known antioxidant in the art, as the stabilizer as taught in Davis.

Regarding claims 14 and 15, Preston teaches that it is known in the art how to select for nickel by adjusting the pH. Therefore, Preston teaches how to produce a leach solution with little nickel so that the cobalt and other impurities remain in the leach solution (pg. 1, lines 50-57).

Regarding claim 17, Cheng teaches preliminary iron precipitation that is conducted to precipitate out iron to leave an aqueous leach solution containing the target elements (pg. 11).

Regarding claims 22-25, Cheng teaches selective stripping of manganese and copper after the scrubbing of the organic phase to separate the Mn from the Co. An acid

Art Unit: 1793

solution is used so that the Co will be in the organic solution. The pH of the aqueous phase is in the range of 3 to 4.5 (pg. 9, line 16- pg. 10, line 22). Although Cheng does not teach this exact separation, Cheng teaches that it is known in the art to separate the cobalt and manganese with hydrogen sulfide. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to separate these metals at this step under these conditions depending on the desired outcome. Further, Cheng teaches that it is known with this extraction process that the pH gap can be adjusted so that nickel and cobalt can be separated from manganese and calcium. Cheng teaches the difference in pH to be used when manganese is to be recovered (pg. 12, lines 24-29; pg. 17, Example 2).

Regarding claim 26, Cheng teaches the use of bulk stripping to recover cobalt (pg. 9, lines 1-15).

Regarding claim 28, Cheng teaches in Figures 3 and 4 that cobalt can be separated from manganese by solvent extraction and that manganese can then separated using a solvent extraction step. Manganese would be in the organic phase (pg. 9, lines 16-18). Cheng also teaches a leach where Mn is sufficiently separated from Ca and Mg (pg. 9).

Regarding claim 29, Cheng teaches scrubbing following the organic extraction phase (pg. 8, line 36-pg. 9, line 11).

Regarding claim 34, Preston teaches the recovery of metals from a solution. Therefore, the product is anticipated.

Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Preston (GB 2,109,357) in view of Davis (US 4,104,359) in view of Cheng (WO 02/22896) as in claim 1 above, further in view of Mihaylov (US 5,447,552). Mihaylov teaches a leach where nickel is separated from other ions which are in the leach solution. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the leach of Mihaylov with the process of Cheng because Cheng teaches that it is known in the art that a pH gap allows for selective leaching of certain metals such as nickel (pg. 4). Further, Mihaylov teaches that it is known in the art how to separate manganese from nickel and cobalt through pH adjustment (col. 2, lines 60-62; col. 4, lines 9-45).

Regarding claim 16, Mihaylov teaches the presence of these impurities in the leach solution and retaining nickel and/or cobalt. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have these elements in the leach solution as they would be present in the ore to be leached. Cheng also teaches the presence of these elements except for nickel and cobalt because Cheng targets another metal. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the pH as taught in Cheng to target another metal and obtain a leach solution with the claimed elements.

Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Preston (GB 2,109,357) in view of Davis (US 4,104,359) in view of Cheng (WO 02/22896) as in claim 1 above, further in view of Mihaylov (US 5,447,552). Mihaylov

Art Unit: 1793

teaches the extraction of cobalt from manganese where the leach solution must be at a pH of between about 2 and 6 for the extraction. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Mihaylov with the process of Cheng because Cheng teaches that it is known in the art to use the extraction process in order to extract metal impurities depending on the desired target. Further, one of ordinary skill in the art would be able to optimize the pH of the extraction in order to obtain the desired metals.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Preston (GB 2,109,357) in view of Davis (US 4,104,359) in view of Cheng (WO 02/22896) as in claim 1, further in view of Dreisinger (WO 98/14623). Dreisinger teaches the extraction of copper into the organic solvent where the copper may then be displaced by an ion exchange and precipitated (pg. 5-6). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Dreisinger with the process of Cheng because Dreisinger teaches a process where the copper can be precipitated and re-leached and copper is a valuable metal when displaced from contaminating metals such as zinc and cobalt.

### ***Response to Arguments***

Applicant argues that one cannot extrapolate the teachings of Mihaylov for other extractants, however, one of ordinary skill in the art would know how to adjust pH of an extraction process depending. Adjusting the pH to improve separation is well known in the applicable art.



***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MELISSA STALDER whose telephone number is (571)270-5832. The examiner can normally be reached on Monday-Friday, 8:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MS

December 8, 2009

/Melvin Curtis Mayes/

Supervisory Patent Examiner, Art Unit 1793